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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/827,370	04/20/2004	Robert Guido Mejia	200312000-1 (SEAG 77940)	3800
7590 11/15/2007 Benjamin T. Queen, II Pietragallo, Bosick & Gordon LLP One Oxford Centre, 38th Floor 301 Grant Street Pittsburgh, PA 15219			EXAMINER HALEY, JOSEPH R	
			ART UNIT 2627	PAPER NUMBER
			MAIL DATE 11/15/2007	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/827,370	<b>Applicant(s)</b> MEJIA ET AL.	
	<b>Examiner</b> Joseph Haley	<b>Art Unit</b> 2627	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 27 August 2007.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-62 is/are pending in the application.
- 4a) Of the above claim(s) 4-7, 19-21, 23-26, 31-42 and 45-62 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3, 8-18, 22, 27-30, 43 and 44 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-3, 8, 9, 22 are rejected under 35 U.S.C. 102(e) as being anticipated by Binnig et al. (US 7054257).

In regard to claim 1, Binnig et al. teaches a cantilever (fig. 2 element 11) disposed with a medium which is movable relative to the cantilever (fig. 2 element 16); a device associated with the cantilever and which is configured to be responsive to changes in electrical field between the medium and the cantilever caused by a change in distance between the medium and the cantilever (column 7 lines 10-30 and fig. 3 element 25. see also column 18 lines 59-67 and column 19 line 1 and fig. 9); a heater disposed on the cantilever for selectively heating the medium and for inducing localized topographical changes which represent bits of data (column 6 lines 65-67 and column 7 lines 1-2 see also fig. 4b element 36); and a circuit which electrically interconnects both of the device and the heater (see fig. 4b).

In regard to claim 2, Binnig et al. teaches wherein the circuit forms at least a part of one of the device (see fig. 4b).

In regard to claim 3, wherein the circuit has portions which are common to both the device and the heater (There must be portions connecting the read element 25 of Binnig et al. and the heater).

In regard to claim 8, Binnig et al. teaches wherein the cantilever comprises a probe which extends from the cantilever and which is configured to be contactable with a surface of the medium and to respond to a topography of the medium to cause the distance between the cantilever and the medium to vary (fig. 2 element 13).

In regard to claim 9, Binnig et al. teaches wherein the medium is electrically non-conductive and is supported on an electrically conductive substrate (column 6 lines 62-64).

In regard to claim 22, see claim 1 rejection above.

In regard to the electrically non conductive medium of claim 22, see claim 9 rejection above.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 10-13, 15-18, 27-30 and 43-44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Binnig et al. in view of Azuma et al. (US 6477132).

In regard to claim 10 and 27, Binnig et al. teaches all the elements of claim 10 except wherein the device is a FET (Field Effect Transistor).

Azuma et al. teaches wherein the device is a FET (Field Effect Transistor) (column 18 lines 29-37).

The two are analogous art because they both deal with the same field of invention of recording on a medium

At the time of invention it would have been obvious to one of ordinary skill in the art to provide the apparatus of Binnig et al. with the FET's of Azuma et al. The rationale is as follows: At the time of invention it would have been obvious to provide the apparatus of Binnig et al. with the FET's of Azuma et al. because FET's can act as switches that are small and use very little power.

In regard to claims 11 and 28, Azuma et al. teaches wherein the circuit comprises a plurality of electrically conductive traces which are formed in the cantilever and which comprise a source and a drain of the FET and wherein the source or drain of the FET forms part of a circuit which supplies electrical current to the write/read tip (fig. 1).

In regard to claim 12, Azuma et al. teaches wherein the plurality of electrically conductive traces further comprise a channel interposed between the source and the drain of the FET (see fig. 1 the wire connecting the source and the drain. There also must be a connection within the source and drain within the FET).

In regard to claim 13, Binnig et al. teaches wherein the cantilever is made of silicon and the electrically conductive traces are formed by doping the silicon to render selected regions electrically conductive (column 6 lines 56-59).

In regard to claims 15 and 44, Binnig et al. teaches wherein the cantilever has a pair of arms which are interconnected by a bridge member (fig. 5 element 45), wherein the probe is formed on the bridge member (fig. 5 element 47), wherein the heater is formed on the bridge member and wherein the doped traces are formed on both arms (see fig. 4b element 39 and column 6 lines 56-59).

In regard to claim 16, Binning et al. teaches feeding a heater element with a current (see figs 4 and 5).

Azuma et al. teaches feeding the probe with a current driven by a FET (fig. 1 elements 201-205).

In regard to claims 17 and 29, Azuma et al. teaches an induced channel FET (column 7 lines 19 and 20).

In regard to claim 18, Binning et al. teaches wherein the medium is electrically non-conductive and is supported on a substrate which is electrically conductive (see claim 9 rejection above), and wherein the substrate is configured to be circuited with the tip so that variations in the electrical field which result from a change in distance between the medium and the cantilever, induces a change in electrical current passing through the tip, and produces a read signal (see claim 1 rejection above).

In regard to the FET of claim 18, see claim 10 rejection above.

In regard to claim 30, Azuma et al. teaches wherein the cantilever is formed of silicon and the tip comprises a doped portion which is electrically connected with doped regions that form a source and a drain of the FET (see fig. 1 see also column 6 lines 24-33).

In regard to claim 43, Azuma et al. teaches FET means formed in a silicon cantilever by doping electrically conductive source and drain regions in a selected surface of the cantilever (see fig. 1 see also column 6 lines 24-33), for being gated by an electric field which is generated by applying a bias to a substrate separate from the cantilever (fig. 15 element 45. see also column 18 lines 1-7. see also fig. 3 element 1010 and column 9 lines 36-38); a probe on the selected surface of the cantilever (fig. 15 elements 11 and 12).

Binnig et al. teaches heater means in the cantilever proximate the probe for heating and forming a data bit indicative topography in a medium to be engaged by the probe (fig. 4 element 39).

Claims 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Binnig et al. in view of Azuma et al. further considered with Mamin et al. (US 5729026).

In regard to claim 14, Binnig et al. and Azuma et al. teach all the elements of claim 14 except wherein the heater comprises a doped region having an electrical resistance which is higher than the traces.

Mamin et al. teaches wherein the heater comprises a doped region having an electrical resistance which is higher than the traces (fig. 1d elements 123 and 125).

The three are analogous art because they all deal with the same field of invention of recording on a medium.

At the time of invention it would have been obvious to one of ordinary skill in the art to provide the apparatus of Binnig et al. with Azuma et al. and the doped heater of Mamin et al. The rationale is as follows: At the time of invention it would have been obvious to provide the apparatus of Binnig et al. provide the apparatus of Binnig et al. with Azuma et al. and the doped heater of Mamin et al because it can be easily manufactured (column 4 line 7).

#### ***Response to Arguments***

Applicant's arguments, filed 8/27/07, with respect to the rejection(s) of claim(s) 14 under U.S.C 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Mamin et al.

Applicant's arguments filed 8/27/07 have been fully considered but they are not persuasive. In regard to applicant's arguments that Binning et al. does not show a device associated with the cantilever and which is configured to be responsive to changes in electrical field between the medium and the cantilever caused by a change in distance between the medium and the cantilever, the examiner maintains this rejection because in fig. 9 and column 18 lines 59-67 and column 19 line 1 there is a method shown of proximity sensing by using the capacitance between electrodes.

On page 21, applicant argues that Binning et al. does not disclose or suggest an electrically conductive substrate because silicon is a semiconductor not a conductor.



However the claim only requires the substrate to be electrically conductive not a conductor. It is known that semiconductors conduct electricity under certain constructions.

On page 22, applicant argues that Azuma et al. does not teach a plurality of electrically conductive traces which are formed in the cantilever and which comprise a source and a drain of the FET and wherein the source or drain of the FET. However, the examiner maintains this rejection because it is shown in fig. 1 a probe with a FET that contains a source and a drain. It is clear from this figure this limitation is met.

On page 24, applicant argues that Binning et al. does not teach the use of a FET as a heater. However the examiner maintains this rejection because the examiner did not state the FET is used as a heater. It was stated that the FET of Azuma et al. was used to feed current to a probe. The probe of Binning et al. could then be modified to include a FET to feed the current to the heater.

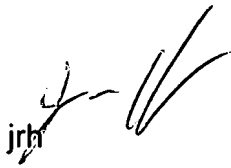
On page 25, applicant argues that Azuma et al. does not teach the source and drain regions of the FET can be gated by an electric field which is generated by applying a bias to a substrate separate from the cantilever. However it is shown in fig. 3 element 1010 and column 9 lines 36-38 that Azuma et al. teaches this feature.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph Haley whose telephone number is 571-272-0574. The examiner can normally be reached on M-F 8:30am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William Korzuch can be reached on 571-272-7589. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

  
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